



# Test methods for Score-Based Interactive Music Systems Toward a formal Specification

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# Test methods for Score-Based Interactive Music Systems

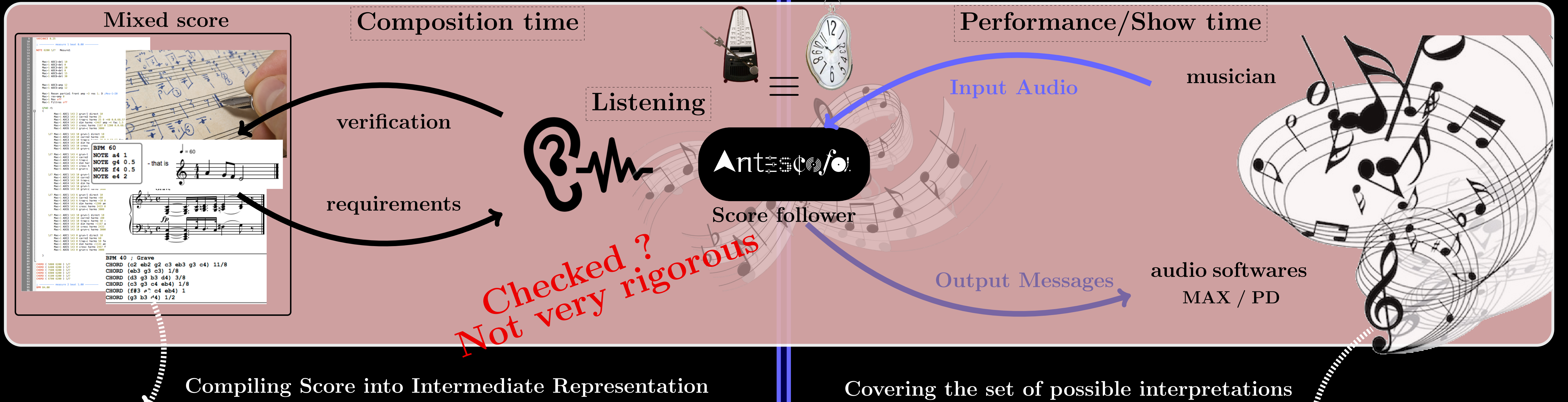
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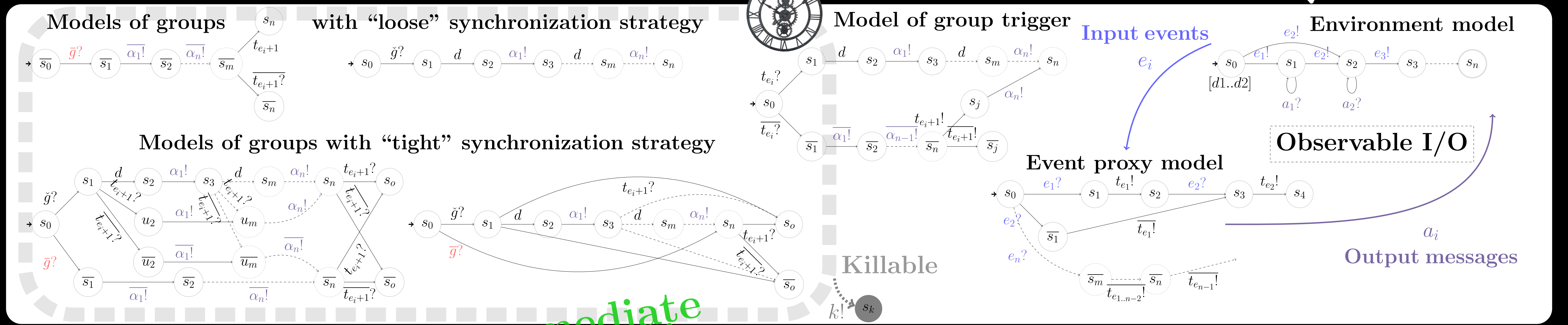
How be sure of a Score-Based Interactive Music System's behavior during shows ?

Ensuring a “guarantee” on the behavior of a complex real-time system is not trivial and requires formal method. **Today**, Antescofo's behavior is “manually” checked by the compositor during rehearsals. Since rehearsal performances represent just a few set of all possible interpretations of a score, this method is not rigorous.

## Manual piece preparation



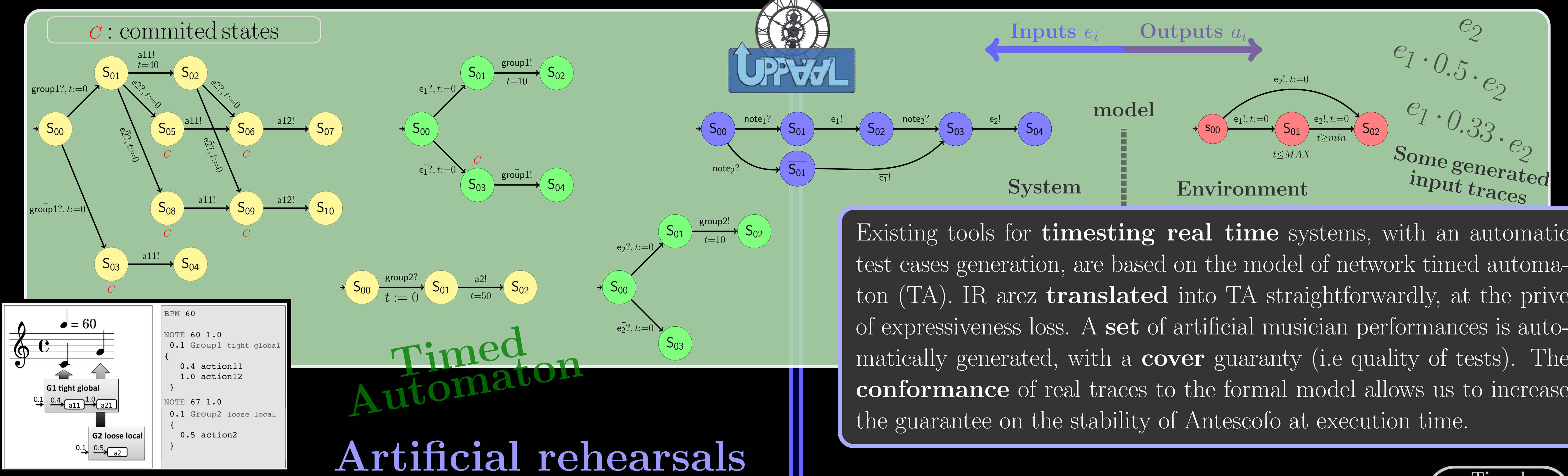
## Toward a formal Specification



Translating into standard formal models  
(i.e Timed Automaton used by the Uppaal verification suite for realtime systems)

The **Intermediate Representation** is a step toward a formal specification of Antescofo's expected behavior. It is a **model** of *How* Antescofo's reactive engine should compute its timed output for **every** inputs (i.e musician performances). IR can be represented with Extended Timed Input/Output Labelled Systems. Each system starting at its  $s_0$  or  $\bar{s}_0$  state and waits on an edge  $\delta?$  for a fire of  $\delta!$  of the symbol  $\delta$ . IR is able to specify multi-clocks, concurrences, dynamic variables...

## Model Based Test Generation



Existing tools for **timesting real time** systems, with an automatic test cases generation, are based on the model of network timed automaton (TA). IR arez **translated** into TA straightforwardly, at the prive of expressiveness loss. A **set** of artificial musician performances is automatically generated, with a **cover** guaranty (i.e quality of tests). The **conformance** of real traces to the formal model allows us to increase the guarantee on the stability of Antescofo at execution time.

## Artificial rehearsals

Antescofo  
show !  
secured for the

MUTANT website



Project ANR-12-CORD-0009